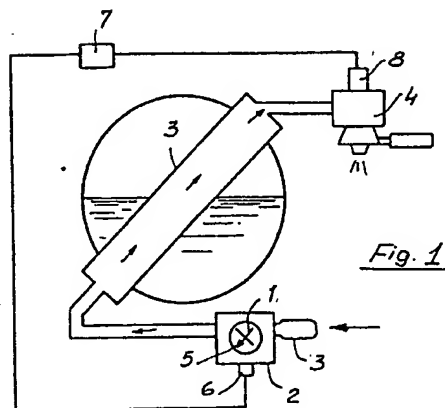


# (12) UK Patent Application (19) GB (11) 2 008 540 A

(21) Application No. 7842118  
(22) Date of filing 25 Oct 1978  
(23) Claims filed 25 Oct 1978  
(30) Priority data  
(31) 30061  
(32) 25 Nov 1977  
(33) Italy (IT)  
(43) Application published  
6 Jun 1979  
(51) INT CL<sup>2</sup>  
B67D 5/20  
(52) Domestic classification  
B8N 24B1B HCC  
(56) Documents cited  
GB 1502661  
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GB 758755  
(58) Field of search  
B8N  
G1N  
(71) Applicant  
Gianpietro Saccani,  
Via Fratelli Cairoli,  
50, Lecco,  
Como,  
Italy.  
(72) Inventor  
Gianpietro Saccani  
(74) Agents  
Chatwin & Company

## (54) Flow controlling system

(57) A device, effective to be applied on to espresso coffee machines for metering the infusion water amount, is characterized in that it comprises a blade impeller (1), located in the infusion water supplying duct, an electrical pulse generating device effective to generate an electrical pulse for each complete revolution of said impeller, accounting and accumulating central block (7) effective to count and accumulate said electrical pulse, and a solenoid valve (8) controlling the water flow to the metering assembly, said solenoid valve being driven by said central block.



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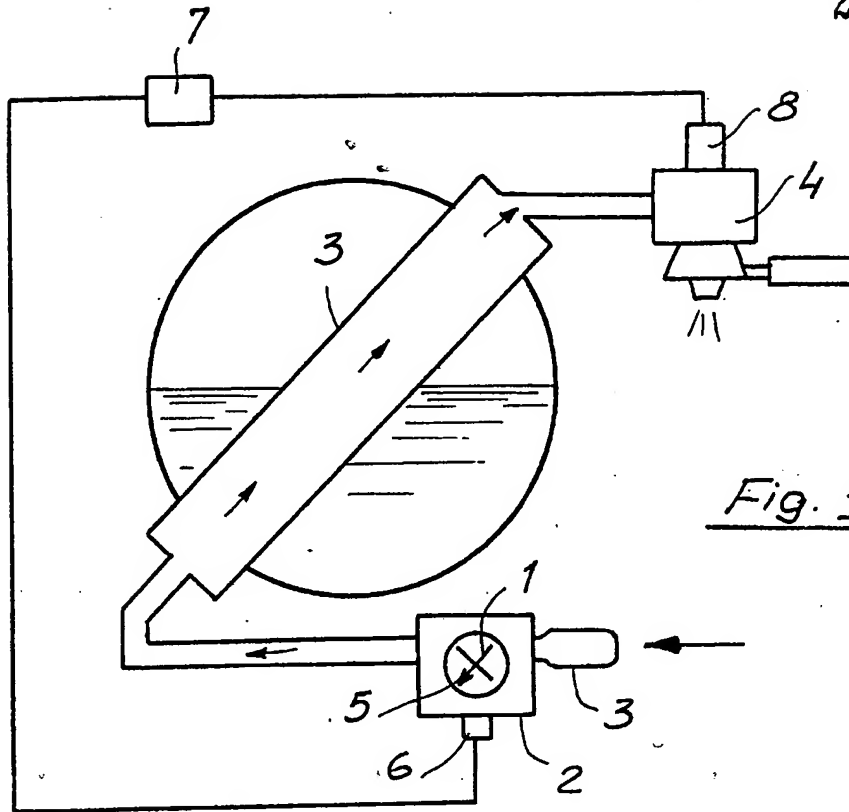
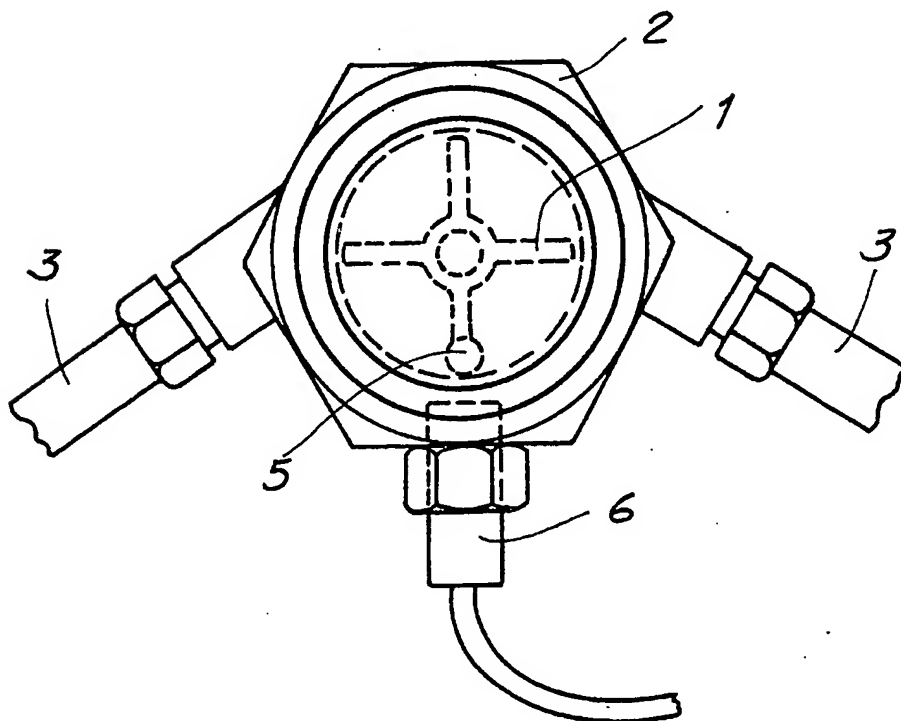


Fig. 1

Fig. 2



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Fig. 3

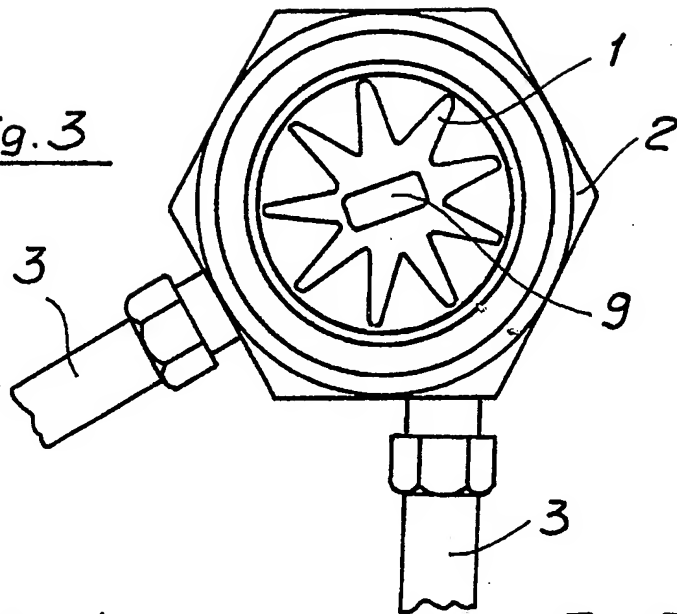


Fig. 4

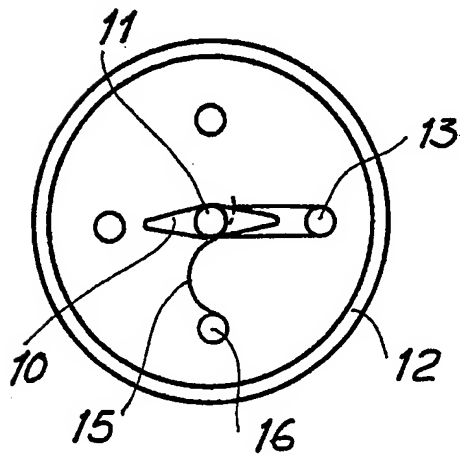


Fig. 5

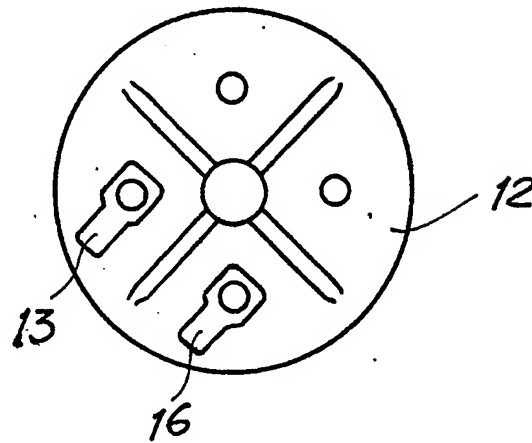


Fig. 6

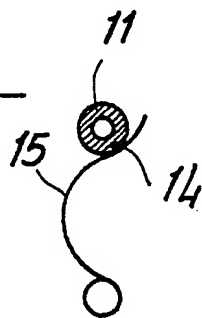
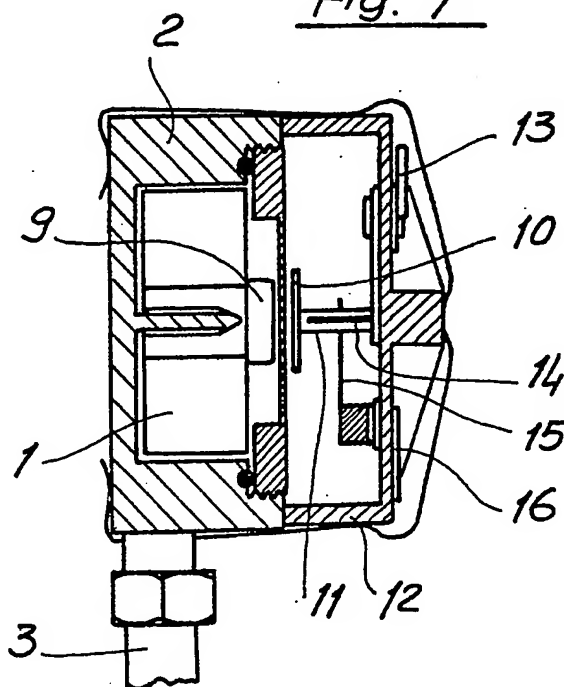


Fig. 7



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## SPECIFICATION

**A device effective to be applied on to espresso coffee machines for the dosing of the infusion water**

5 The present invention relates to a device, effective to be applied onto espresso coffee machines, for dosing the infusion water amount to be conveyed to the metering assembly.

10 As it is known, an espresso coffee machine comprises, substantially, a boiler, for heating the infusion water, a water metering device and a pump.

15 In order to obtain a proper beverage, it is indispensable to provide a correct dosing both of the ground coffee and the infusion water passing through the metering assembly and conveyed onto the ground coffee.

20 The known espresso coffee machines are provided, for controlling the infusion water, with an electromechanic type of members, supplying to the metering assembly, a well determined and constant water amount and, accordingly, by means of this members it is not possible to appreciably vary the supplied water amount.

25 On the other hand, the user requirements are greatly differentiated from one another, and due to these reasons the operator would have to continuously control the supplied water in order to meet the requirements of the single users.

30 Accordingly, it is an object of the present invention to provide a device, effective to be applied onto espresso coffee machines, and able of perfectly and variably dosing, depending on the needs, the infusion water amount, to be conveyed to the metering assembly.

35 It has been found that this object is achieved by a device comprising a plate impeller or rotor, inserted in a suitable housing located in the duct for supplying water to the metering assembly; a source of electrical pulses effective to generate electrical pulses for each complete revolution of said impeller, a central block effective to count and accumulate said electrical pulses, and a solenoid valve controlling the water flow to the metering assembly, said solenoid valve being driven by said central block.

40 The supplying duct is provided, upstream of the housing thereof, with a nozzle arranged in such a way that the water inlet flow, in said housing, causes the rotation of said blade impeller.

45 The electrical pulse generating device may be an indirect type or a direct type of generating device or source. In the first case, said device may be formed by a small metallic mass or block fixed to the end of one of the impeller blades and effective to vary, by the rotation thereof, the intensity or strength of a generic force field.

50 At the outside of the body constituting the housing of said impeller or wheel, is located a member effective to detect said field strength variations. Said detecting member, for each said variation, sends an electrical pulse to said counting and accumulating central block, which may be of any known type.

Said central block or assembly is predisposed in such a way as to act, after a determined and adjustable pulse number, onto a solenoid valve as inserted in the water supplying circuit, upstream of the metering assembly.

70 In this manner, by suitably adjusting, depending on the needs, the aforesaid central block, it is possible to convey to the metering assembly a well defined infusion water amount.

75 In the case in which is used a direct type of electrical pulse generating device, this latter may be formed by a small cylinder of a permanent magnet fixed to the impeller, at the rotation axis thereof and in a radial direction, and effective to generate a suitable magnetic field.

80 At one side of said small cylinder and onto the same axis of the impeller, is located a metal needle mounted onto a conductive shaft connected to a post or terminal of a battery or a current source supplying said counting central block.

85 Said conductive shaft, in particular, is provided with an insulating coating, on the outside of which is located, along the length thereof, a thin metal wire electrically connected to said shaft.

90 Onto said shaft, furthermore, tangentially rests a curved metal wire, effective to contact, for each revolution of said shaft, the above fixed wire, thereby closing the supplying circuit to the counting central block.

95 Accordingly this latter, upon accumulating a predetermined pulse number, closes the solenoid valve located onto the pressurized water conveying duct, upstream of the metering assembly.

100 In order to better comprise the functional and constructional characteristics of the instant device, effective to be applied onto espresso coffee machines, for metering the infusion water, the invention device will thereinbelow described referring to the figures of the accompanying drawings illustrating a preferred, exemplificative and not limitative embodiment thereof, in which:-

105 *Figure 1* schematically illustrates the boiler and the metering assembly of an espresso coffee machine, onto the infusion water supplying duct of which is inserted the instant metering device;

110 *Figure 2* is a detail view of the indirect pulse generating device or source;

*Figure 3* is a detail view of the impeller in the case in which is used a direct pulse generating device or source;

115 *Figures 4 and 5* are respectively inner and outer views of the movable-needle envelope of a direct pulse generating device;

*Figure 6* is a detail view illustrating the member effective to act as a rotating switch associated to a direct pulse generating device or source;

*Figure 7* schematically illustrates the cross-section of the direct pulse generating device shown in Figures 3 to 6.

120 Referring particularly to Figures 1 and 2, the metering device, effective to be applied onto espresso coffee machines, according to the present invention, comprises a blade impeller (1), inserted in a hollow body (2) mounted onto the duct (3) supplying the infusion water to the metering assembly (4).

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In particular, the inlet of the water into the hollow body (2) is through a suitably oriented nozzle, thereby the water jet causes said impeller (1) to rotate.

- 5 At the end of a blade of the impeller (1) is located a small metal mass (5) which, during the rotation, causes a variation of the force field strength, which is, preferably, of the magnetic type.

- 10 Said variation of the field strength or intensity is detected by a suitable sensor (6), of known type, which, for each passing of the metal mass (5), generates an electric pulse, and sends said electric pulse to a counting and accumulating central block (7).

- 15 This latter, in turn, drives a solenoid valve (8) located upstream of the metering assembly (4) and effective to control and lock the infusion water flow.

- Furthermore, said central block (7) may be adjusted in such a way as to act onto the solenoid valve (8) upon receiving a predetermined pulse number.

Accordingly the supplied or metered water amount may be practically perfectly dosed, in function of the revolution number of the impeller (1).

- 25 Referring to Figures 3 to 7, said impeller (1) is provided, at the axis thereof and radially arranged, with a small cylinder (9) of a permanent magnet.

- Said small cylinder (9), during the rotation thereof, causes a needle (10), as mounted onto a small shaft (11), to rotate. Said shaft (11) is pivoted at the center of a box-like body (12), located on one side of the hollow body (2).

- In particular the shaft (11) is connected to an outer terminal or post (13) and has the wall thereof suitably insulated, except at a longitudinal line (14).

- 30 Onto said shaft (11) tangentially rests a conductive wire (15), of a suitable resiliency, connected to a second outer terminal or post (16).

- The two posts (13) and (16) are inserted in the supplying circuit of said central block (7), in such a way as to send an electrical pulse thereto, each time the conductive wire (15) slides onto the uninsulated line (14) of the shaft (11), i.e. at each complete revolution of the blade impeller (1).

- 45 From the above description and the examination of the several figures of the accompanying drawings, the great functionality and practicality of use characterizing the infusion water metering device effective to be applied onto espresso coffee machines according to the present invention are self evident.

- Obviously the device and the carrying out way thereof have been thereinabove described and illustrated only as an indicative demonstrative and not limitative example. Accordingly several changes and modifications of shape, sizes and construction may be carried out in the practical making of the instant infusion water metering device for espresso coffee machines.

## 60 CLAIMS

1. A device, effective to be applied onto espresso coffee machines for metering the infusion water amount to be conveyed to the metering

- 70 assembly, characterized in that it comprises a blade impeller, located in the infusion water supplying duct, an electrical pulse generating device effective to generate an electrical pulse for each complete revolution of said impeller, accounting and accumulating central block effective to count and accumulate said electrical pulse, and a solenoid valve controlling the water flow to the metering assembly, said solenoid valve being driven by said central block.

2. A device according to Claim 1, characterized in that said blade impeller is inserted in a hollow body mounted onto the infusion water supplying duct and in which the water inlet into said body is carried out by means of a nozzle.

3. A device according to Claims 1 and 2, characterized in that the electrical pulse generating device comprises a small metal mass located at the end of a blade of said impeller and effective to cause, during the rotation, a variation of a magnetic type of force field, and a sensor of known type which, for each variation of said force field, generates and electrical pulse.

4. A device according to Claims 1 or 2, characterized in that said electrical pulse generating device comprises a small cylinder of a permanent magnet located at the axis of said impeller and radially thereto; a needle, mounted onto a shaft pivoted at the centre of a box-shaped body located on one side of the hollow body of the impeller and rotated by said small cylinder; an outer post provided with only an uninsulated longitudinal length, connected to the shaft, and a resilient conductive wire connected to a second outer post or terminal, tangentially resting on said shaft, both said outer posts being inserted in the central block supplying circuit.

5. A device effective to be applied onto espresso coffee machines for metering the infusion water amount to be conveyed to the metering assembly, as hereinabove described and illustrated in the figures of the accompanying drawings.